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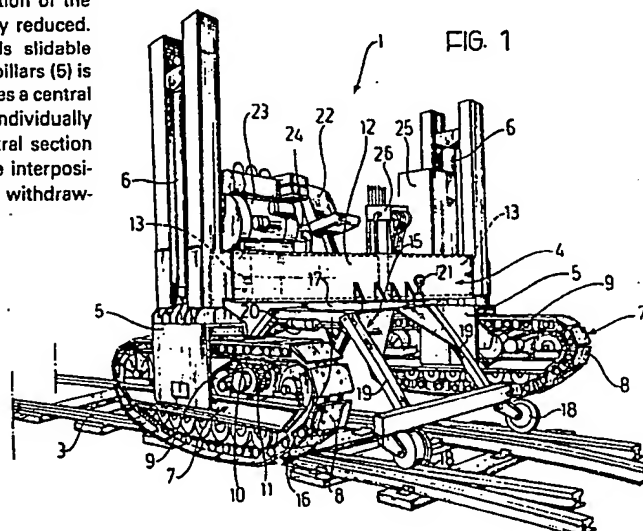
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64 Portal for removing and laying railway tracks, particularly points.

67 A portal (1) for removing and laying railway tracks (3), particularly points, allows the period of interruption of the railway and the work force used to be drastically reduced. The portal (1) has a crossbeam (4) with ends slidable vertically along respective pillars (5). Each of the pillars (5) is provided with tracks (8). The crossbeam (4) includes a central section (12) and end sections (13) which can be individually extended from the central section (12). The central section (12) is mounted on a railway bogie (16) with the interpositioning of a turntable (17), the bogie (16) having withdrawable, retractable wheels (18).



Portal for removing and laying railway tracks,  
particularly points

The present invention relates to a portal for removing and laying railway tracks, particularly points.

More particularly, the portal which is the subject of the present invention is of the type having a crossbeam  
5 with ends which are vertically slidable along respective pillars.

It is known that it is periodically necessary to replace sections of railway track, for example, during maintenance of the railway network, by removing the  
10 assembly of the rails and their sleepers which no longer meet the required standards of efficiency and safety in order to replace them with a new assembly of rails and sleepers properly assembled beforehand.

This replacement operation should be carried out  
15 quickly so as to limit the consequences of interruption to the railway and, if possible, to prevent any shutdowns of the tracks adjacent that undergoing maintenance.

At present, the track sections to be replaced are  
20 raised by means of portals which are movable on auxiliary rails located at the sides of the track undergoing maintenance. This procedure is particularly complicated and requires a large amount of time, as well as resulting in considerable interference with the running of trains  
25 on the tracks adjacent that undergoing maintenance.

When the track section to be replaced includes points, the replacement operation is even lengthier and more difficult at present, and requires the use of a very large work force. Indeed, it is not possible to  
30 lay the auxiliary rails alongside the track section including the points, and the points must be raised from the ballast by batteries of jacks to such an extent as to allow the laying of auxiliary rails underneath them in alignment with the railway track  
35 and the insertion of a plurality of bogies between

the points and the auxiliary rails, on which the points are then rested and by means of which they are carried away.

The operation of laying new points is exactly the same and, moreover, is made even lengthier and more difficult by the need to bring the ends of the points into exact alignment with the rest of the track.

All these disadvantages have had to be accepted until now. With regard to the duration of the interruption to the railway, in order to try to reduce this as much as possible, considerable financial rewards have been instituted for the gangs of skilled workmen, the amount of the awards increasing with the time saved relative to the time expected.

Thus, there has been a strongly-felt need to overcome the aforementioned disadvantages which are at present encountered in the removal and laying of railway tracks and particularly of points.

The problem behind the present invention is that of devising a portal of the type specified, which has structural and functional characteristics such as to satisfy the said requirement.

This problem is solved by a portal of the type specified in which each of the pillars has its own means of individual advancement on the ground, for example, tracks or tyred wheels.

To advantage, in the portal according to the invention, the crossbeam comprises a central section and end sections which can be withdrawn individually from the central section, the central section being provided with its own retractable support means.

Further characteristics and advantages of the portal according to the invention will emerge from the following description of a preferred embodiment, given by way of non-limiting example with reference to the appended drawings, in which:

Figure 1 is a perspective view of a portal according

to the invention in one of its positions of operation;

Figure 2 is a perspective view of the portal of  
Figure 1 in another position of operation;

Figures 3 to 10 are schematic perspective views on  
5 a reduced scale of the portal according to the  
invention in successive positions of operation, and

Figure 11 is a schematic perspective view on a  
further reduced scale of three portals according to the  
invention used for the removal and laying of points.

10 With reference to the appended drawings, a portal  
according to the invention is generally indicated 1.

The portal 1 is used for the removal and laying of  
sections of railway track, particularly points. The  
operation of the portal 1 will be described below with  
15 reference to the removal of worn points 2A and the laying  
of new points 2B to replace them along a railway line 3.

The portal 1 is of the type in which a horizontal  
crossbeam 4 has ends slidable vertically along respective  
lateral pillars, both indicated 5, under the action of  
20 respective vertical hydraulic cylinders, both indicated 6.

In the portal 1 according to the invention, each  
pillar 5 has its own means 7 of advancement over the  
ground, such that they are self-propelled.

These means 7 each comprise a track 8 rotated by a  
25 respective hydraulic motor 9 which is connected to it by  
a chain transmission with chains 10, 11. The tracks 8  
are of such a length and width as to give the portal the  
stability necessary to allow it to move safely over the  
ground and, in particular, to allow it to move on the  
30 ballast, travelling safely over the sleepers and any  
rails which may be in its path.

In the portal 1 according to the invention, the  
crossbeam 4 includes a central section 12 and end  
sections, each indicated 13. Each of the end sections  
35 13 can be extended individually from the central  
section 12, with which it is engaged telescopically, by  
means of a respective horizontal hydraulic cylinder 14.

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The central section 12 of the crossbeam 4 is provided with its own retractable support means, generally indicated 15. More particularly, the retractable support means 15 comprise a railway bogie 16 on which the central section 12 of the crossbeam 4 is mounted with the interpositioning of a turntable 17. The railway bogie 16 has wheels 18 mounted at the ends of legs 19 which are hinged to the bogie 16 and are angularly displaceable under the action of hydraulic cylinders 20 between a lowered operative position and a retracted withdrawn non-operative position.

A bolt 21 is located in correspondence with the turntable 17 to lock the central section 12 of the crossbeam 4 angularly relative to the bogie 16, either in alignment with the direction of advance of the bogie or perpendicularly thereto.

On the central section 12 of the crossbeam 4 is mounted a seat 22 for an operator, a first motor 23, to advantage a diesel engine, for driving a hydraulic pump 24 which supplies pressurised oil to the hydraulic cylinders, a control box 25 for the hydraulics, and a group of manually-operable directional valves 26 located in front of the seat 22 for use by the operator in controlling the hydraulic cylinders.

Rigid and flexible tubing known in itself and hence not shown connects the pump, the hydraulic cylinders, the hydraulic control box, and the directional valves.

Grippers 27 of a conventional self-closing type for gripping the heads of the rails are suspended by chains 28 from the central section 12 of the crossbeam 4.

The operation of the portal 1 is described below with reference to an initial moment (see Figure 3) when the portal 1, having been driven along the railway line 3, reaches the point where it is to be used. At this moment, the bogie 16 has its wheels lowered into engagement with the track, the crossbeam 4 is supported

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by the bogie 16 in alignment with the direction of the bogie itself and hence with the track, the pillars 5 are vertical and extend above the crossbeam 4 itself, and the tracks are raised to a medium height and are  
5 non-operative.

In this position, it should be noted that the portal 1 lies completely within the clearance prescribed for trains and can therefore be moved freely along the railway.

10 Subsequently, the bolt 21 is removed, the crossbeam 4 is displaced angularly through  $90^{\circ}$  about the turntable 17, and the bolt 21 is inserted again in the new position. The crossbeam (see Figure 4) is thus perpendicular to the direction of the bogie and hence perpendicular to  
15 the track.

Now, depending on the width of the track section, particularly the points, for removal, at the point where the portal is located, the operator increases the width of the portal 1 by extending the end sections 13 of the  
20 crossbeam 4 from the central section 12 thereof by means of the horizontal cylinders 14.

With regard to this increase, and in order to keep it to a minimum, it should be noted that the width of the track may be taken to be the maximum distance between  
25 the rails alone at the particular point, excluding the sleepers. Indeed, at the point where the portal is located, a limited number of sleepers (four or five) may have already been removed.

The width of the portal thus being increased  
30 strictly to the extent necessary, the operator lowers the pillars 5 by means of the vertical cylinders 6, to bring the tracks 8 to bear on the ground. At this moment, the crossbeam 4 and the bogie 16 are raised by reaction (see Figure 6).

35 Subsequently, the legs 19 of the bogie 16 are withdrawn so that the entire space beneath the portal is free. The grippers 27 may now be attached to the

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central section 12 of the crossbeam 4 by means of their chains 28. The operator, again operating the vertical cylinders 6, now lowers the crossbeam 4 until the grippers 27 reach the height of the rails (see Figure 7).

5       Then, by operating the horizontal cylinders 14, the operator effects a horizontal displacement of the central section 12 by reaction against the end sections 13 which are fixed relative to the ground by the pillars (see Figure 8). The amount of the horizontal movement  
10 of the central section 12 is chosen to bring the grippers 27 into a position which is substantially centered relative to the track so that the track can be gripped efficiently.

      The operator, by operating the vertical cylinders 6  
15 again, effects a vertical upward movement of the crossbeam 4 (see Figure 9) which is accompanied initially by the firm closure of the grippers 27 on the respective rails and then the lifting of the track from the ballast.

      The operator then puts the tracks 8 into motion  
20 by means of the hydraulic motors 9, causing the advancement of the portal 1 along the line and hence the removal of the suspended track section (see Figure 10) from its seating.

      Clearly, in the case of relatively long track  
25 sections, as in the case of points, the portal 1 acts in cooperation with other portals (see Figure 11) similar to the portal 1, which are distributed regularly along the points so as to ensure their safe and stable support.

30       In the case illustrated in Figure 11, the three portals 1 are, as described previously, brought astride the points 2A to be removed so as to be positioned at their ends and intermediately. The points 2A are lifted and removed from their seatings by virtue of the  
35 combined action of the three portals, each of which is manoeuvred by a respective operator as described previously. Thus, the points are carried to and placed

on a service bogie 29 waiting on the line 3. The three portals are then brought astride new points 2B which are resting on another service bogie 30 which is waiting on the line 3 on the opposite side from the bogie 29. Acting always in cooperation, the three portals lift the points 2B from the bogie 30 and carry them to the seating on the ballast where they are lowered. The operators ensure the correct alignment of the points with the line 3 by moving the central sections 12 of the respective portals appropriately. When the points are laid, each portal is brought back to its initial condition by repeating the operations described above with reference to Figures 3 to 10 in reverse.

From the structural characteristics of the portal according to the invention and its functional characteristics described above, the unaccustomed rapidity with which track sections in general and points in particular are removed and laid is clear.

In particular, the time necessary for laying the auxiliary rails and the need to use jacks and similar equipment are completely eliminated.

A further advantage of the portal according to the invention lies in the fact that it allows a drastic reduction in the work force which is decreased substantially to the very small number of operators necessary to drive the portals used in the operation.

The portal according to the invention further allows a considerable improvement in the working conditions for the work force to be achieved from the point of view of accidents.

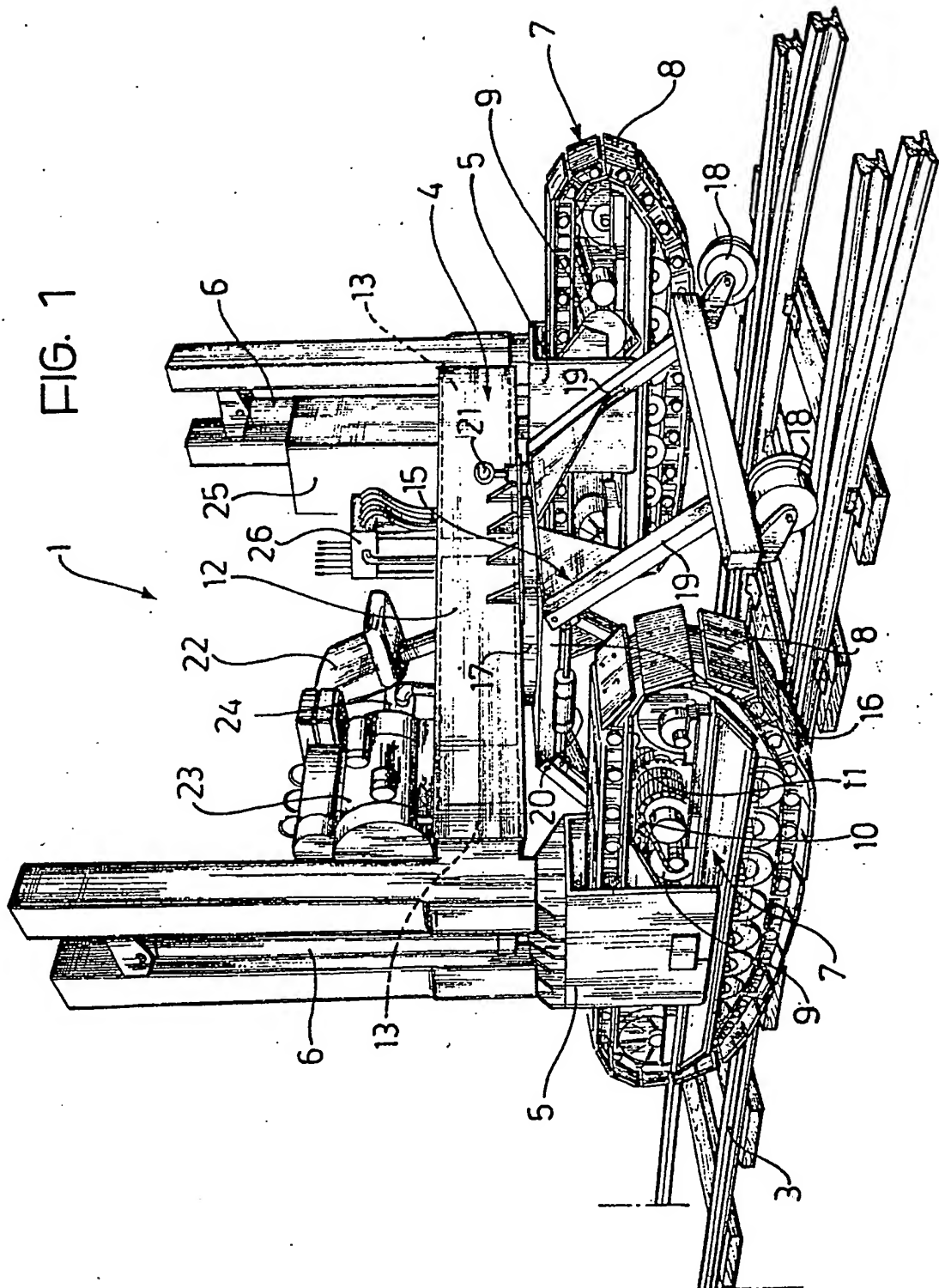
Numerous variations may be made to the portal described above by an expert in the art. For example, the tracks may be replaced by a series of tyred wheels.

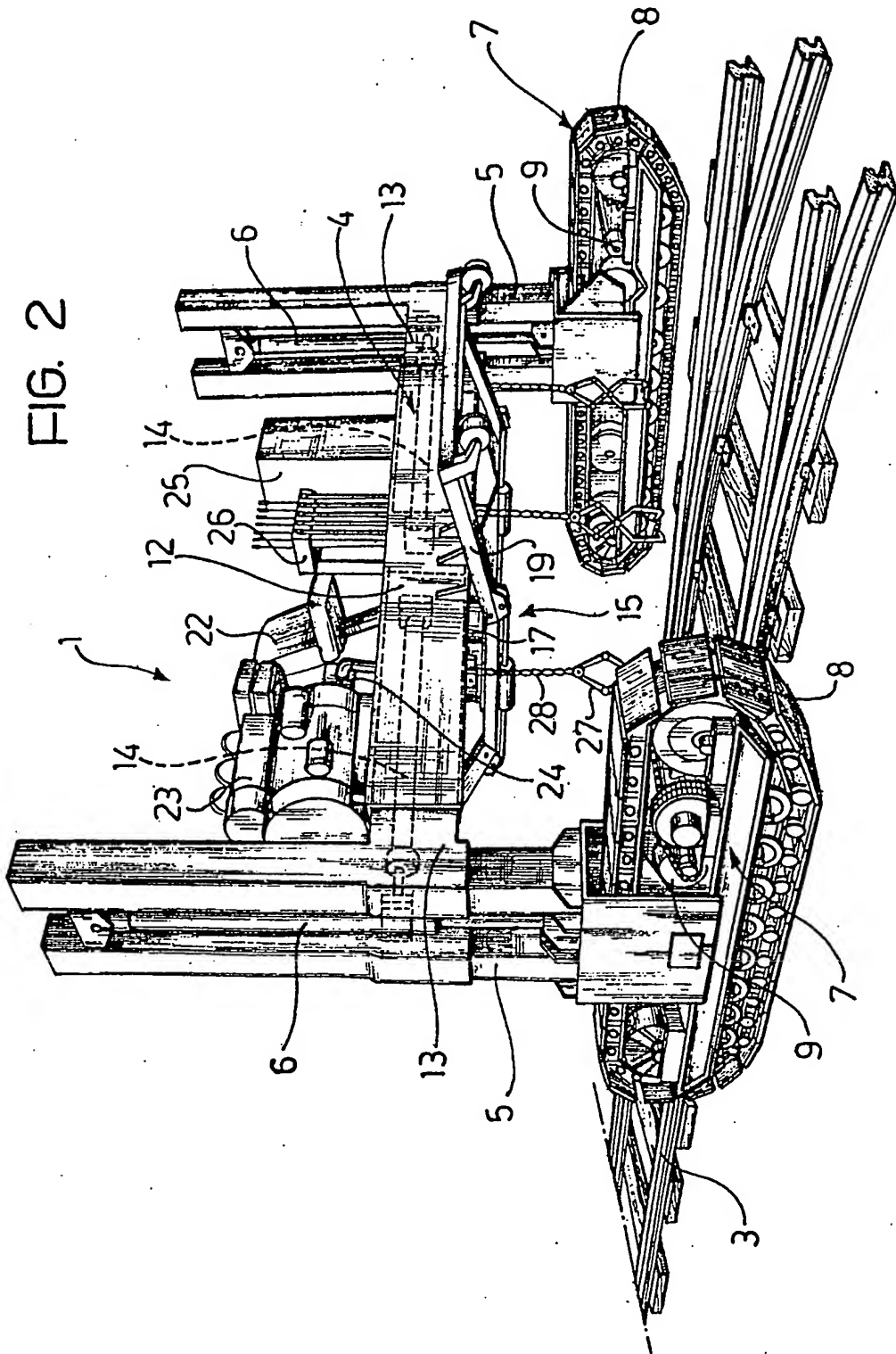
This and any other variant are entirely within the scope of the inventive concept of the present invention as defined by the following claims.



Claims:

1. Portal (1) for the removal and laying of railway tracks (3), particularly points (2A, 2B), of the type having a crossbeam (4) with ends vertically slidable along respective pillars (5), characterised in that each of the pillars (5) has its own means (7) of individual advancement on the ground.
2. A portal as claimed in Claim 1, characterised in that the crossbeam (4) includes a central section (12) and end sections (13) which can be extended individually from the central section (12), said central section (12) having its own retractable support means (15).
3. A portal as claimed in Claim 2, characterised in that the retractable support means are constituted by a railway bogie (16) having withdrawable, retractable wheels (18).
4. A portal as claimed in Claim 3, characterised in that the central section (12) is mounted on the bogie (16) with the interpositioning of a turntable (17).
5. A portal as claimed in any of the preceding claims, characterised in that the advancement means (7) for the pillars (5) comprise tracks (8).
6. A portal as claimed in any of Claims 1 to 4, characterised in that the advancement means (7) for the pillars (5) comprise tyred wheels.





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FIG. 3

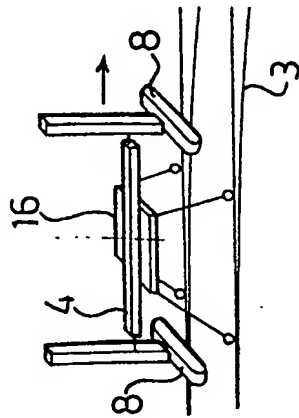


FIG. 4

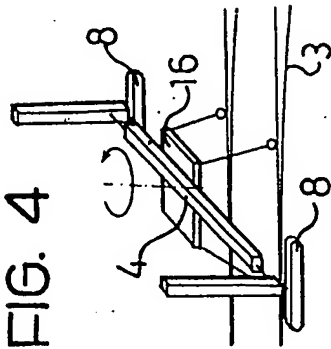


FIG. 5

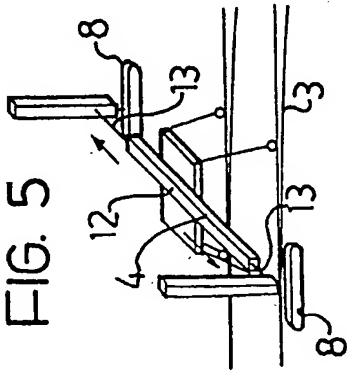


FIG. 6

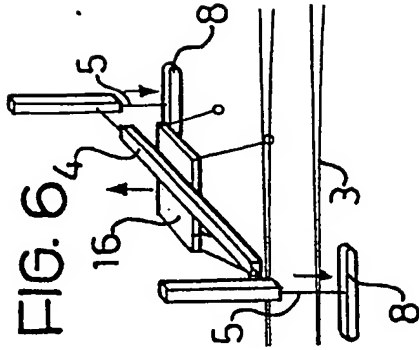


FIG. 7

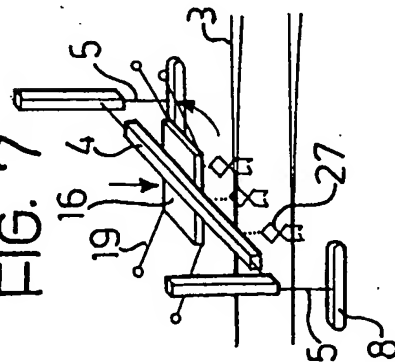


FIG. 8

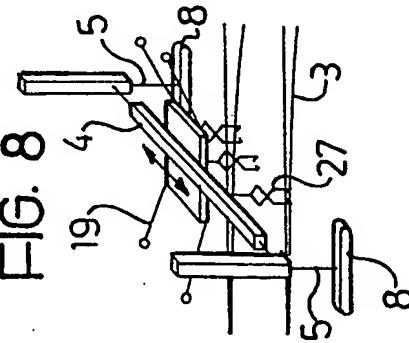


FIG. 9

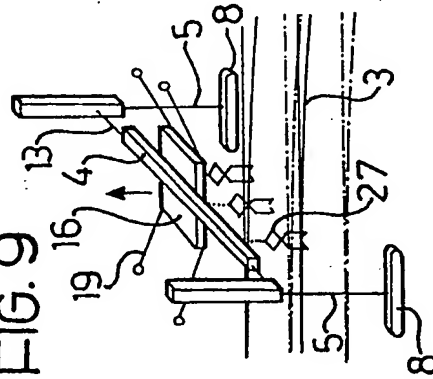
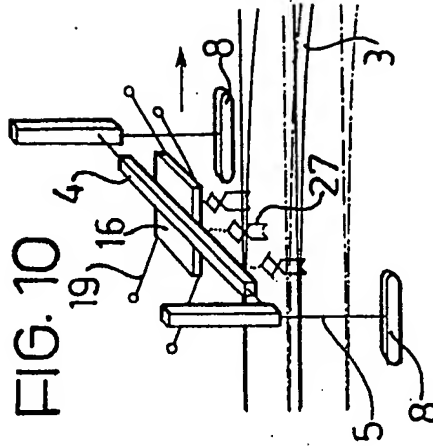


FIG. 10







European Patent  
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# EUROPEAN SEARCH REPORT

0084298

Application number

EP 82 83 0269

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
E, X	EP-A-0 066 312 (AMECA S.N.C. DI GIOVANNI FORNARI E C.) * Complete document *	1-3, 5	E 01 B 29/02
X	DE-A-2 309 930 (J. FRENZEL) * Complete document *	1-3, 5 6	
A	FR-A-2 326 540 (ENTREPRISE JARDIN & BILLIARD) * Page 3, lines 29-35 *	6	
A	FR-A- 884 476 (LES FILS D'ALBERT COLLET) * Page 2, lines 64-82; figures 7, 8 *		
A	DE-C- 563 834 (OTTO TAXIS et al.)		
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 28-02-1983	Examiner PAETZEL H-J
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